PEO STRI

Army Tactical Engagement Simulation System (A-TESS)

Our # 1 Focus

PM TRADE

20Nov12

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Visit the Live Training Community Portal at: LT2Portal.org

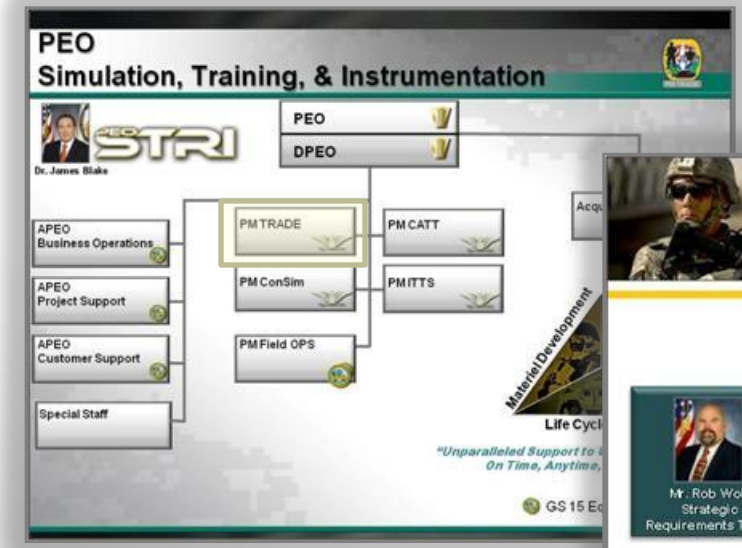
Topics

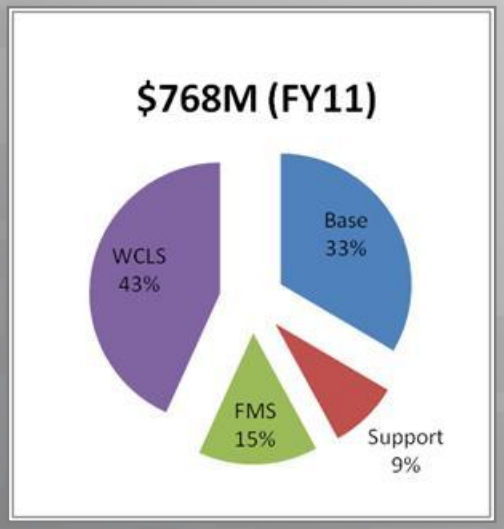
- **Who we are.**
  - ✓ PM Training Devices (TRADE).
  - ✓ Live Training Transformation (LT2).
- **A-TESS.**
  - ✓ Acquisition Approach.
  - ✓ Challenges.
- **Supporting Initiatives.**
  - ✓ Consolidated Product Line.
  - ✓ Architecture
  - ✓ Live Training Engagement Composition (LTEC).
  - ✓ Governance.
  - ✓ Test & Training
  - ✓ MILES / TESS Test Bed.
- **LT2 Standards Body.**
  - ✓ LT2 Standards Portal Update.
  - ✓ LT2 ICD Portal Update.
  - ✓ Standards Calendar.
  - ✓ IS/TESS Test Bed.
  - ✓ Audio & Visual Cueing Standard
  - ✓ Power Standard.
  - ✓ PAN Standard.
  - ✓ PAN Extension.
  - ✓ IS/TESS ICD Redesign.
- ✓ **Wrap-Up.**

PM Training Devices (TRADE)

Delivering the Army Training Capabilities since 1974

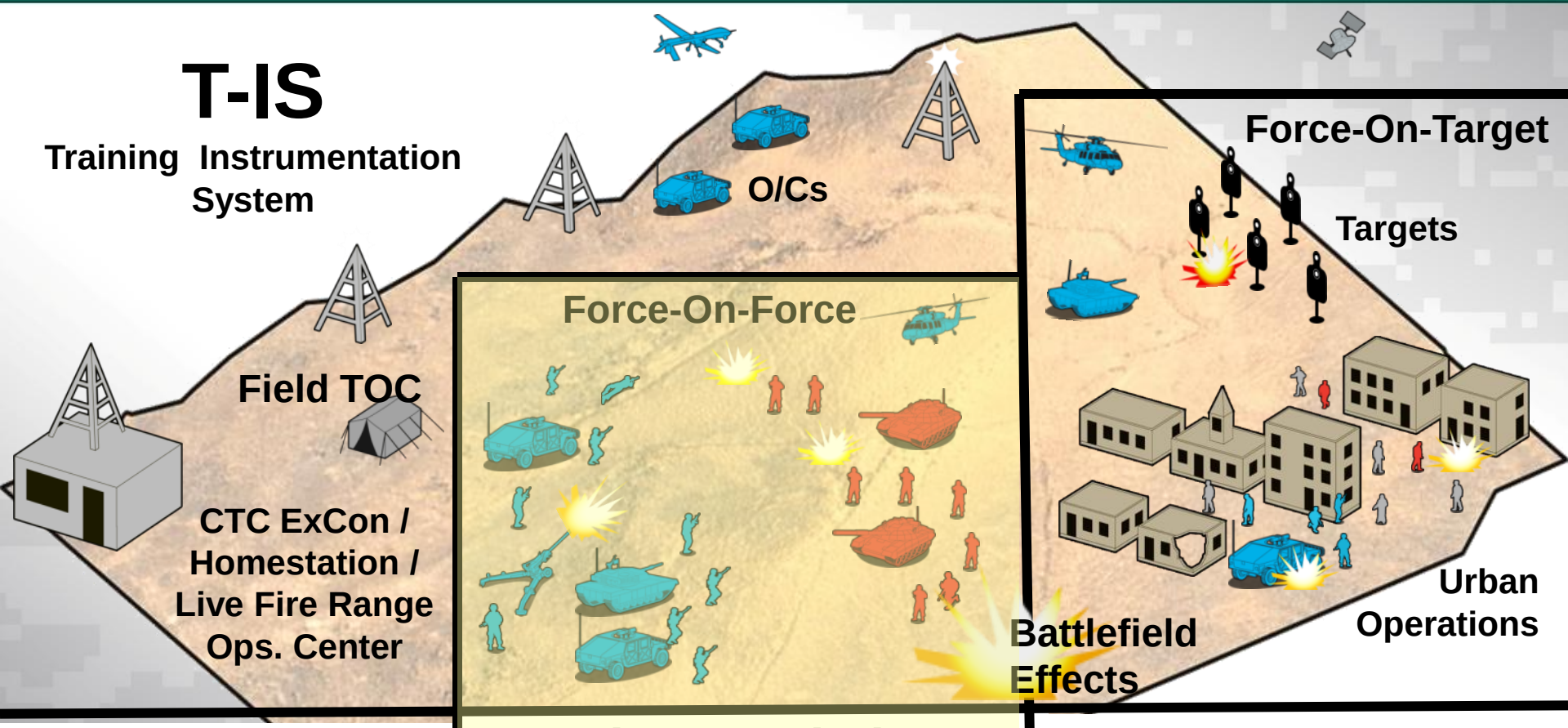
PM TRADE





Live Test & Training

Operational Environment



ExCon & Comms

ExCon, AAR, RF Comms. ABCS, & Network Data Management

PM CTIS

T-IS

Simulated Fire

Combined Arms Engagement Pairing BLUFOR & OPFOR

PM LTS

A-TESS

Live Fire

Instrumented Urban Operations, & Battlefield Effects

PM DT

FASIT

Standards Management (CTIA, A-TESS, FASIT) - APM TRADE

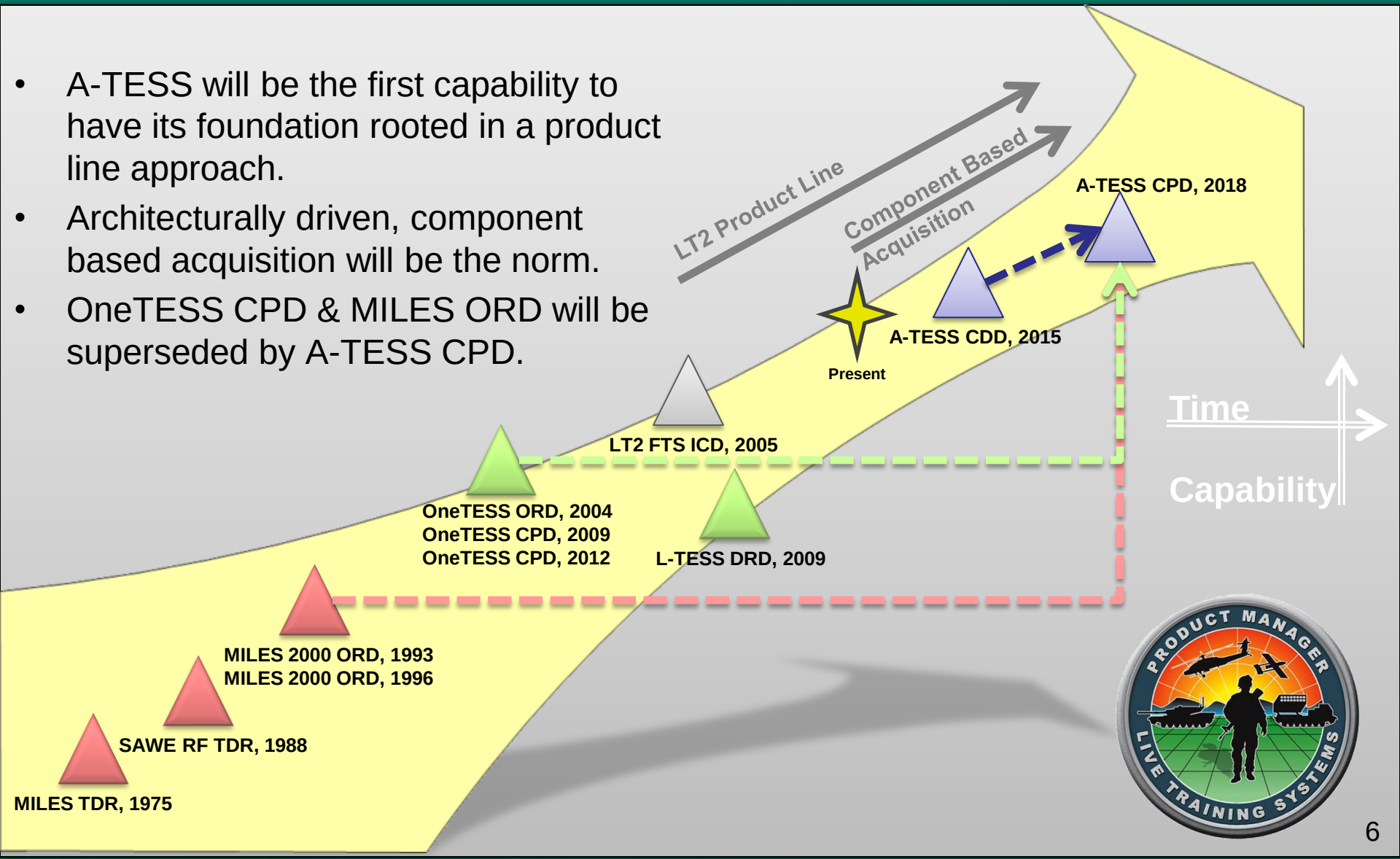
Army Tactical Engagement Simulation System (A-TESS)

The future of Live, Force on Force training.

Acquisition Approach

A Capability Document History Lesson

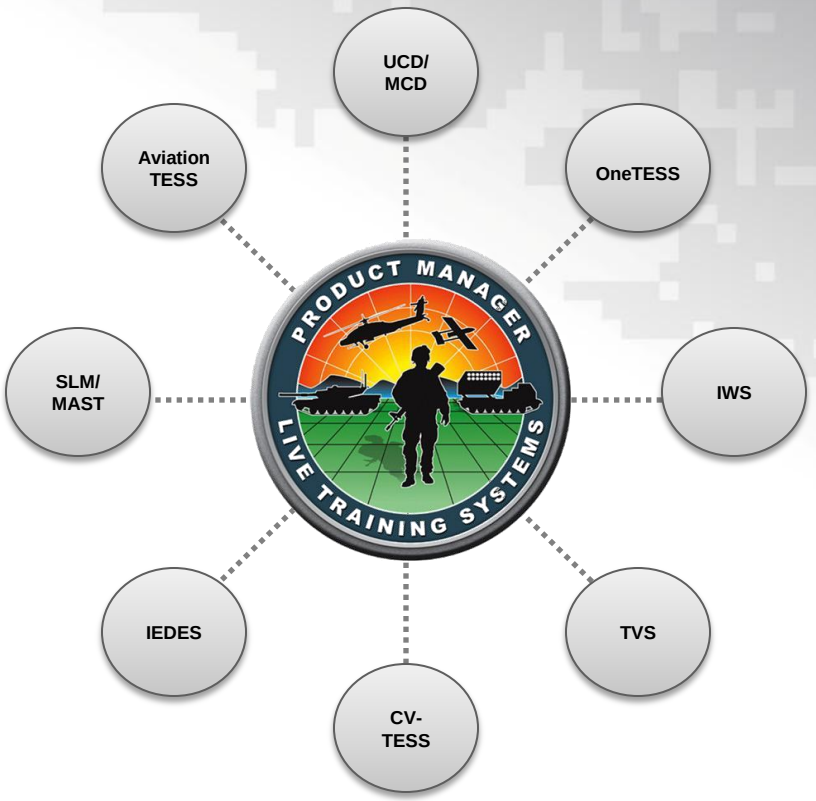
- A-TESS will be the first capability to have its foundation rooted in a product line approach.
- Architecturally driven, component based acquisition will be the norm.
- OneTESS CPD & MILES ORD will be superseded by A-TESS CPD.



Acquisition Approach

Legacy - Limited Interoperability

- Systems currently acquired using the MILES Communication Code (MCC) as the primary mechanism for interoperability.
- Independent PAN for capability.
- Backwards compatibility required with Legacy Systems.
- Limited RDT&E.
- Capability has been injected via obsolescence and PDSS.



Architecturally divergent solutions have yielded a significant sustainment challenge.

Acquisition Approach

The future - Component Based

- Architecturally driven products and solutions.
- Live Training Engagement Composition (LTEC) driven solutions
- Fully interoperable and replaceable components.
  - ✓ Small Arm Transmitters
  - ✓ Detectors
  - ✓ Halo's
  - ✓ CVKI
  - ✓ Dismount/CoB Vests
  - ✓ Human Machine Interfaces
  - ✓ Etc…

Interface management is key to the realization of component based acquisition.

Acquisition Approach

Phased Capabilities

FY18 FY22 FY26 FY30

Increment 1 — MS C — RDT&E — OPA — OMA 15 year Life Cycle

Indirect Fire, Improved Casualty Assessment & Treatment/Equipment Damage Assessment & Repair, Range Dependent PKs

Increment 2 — MS C — RDT&E — OPA — OMA 15 year Life Cycle

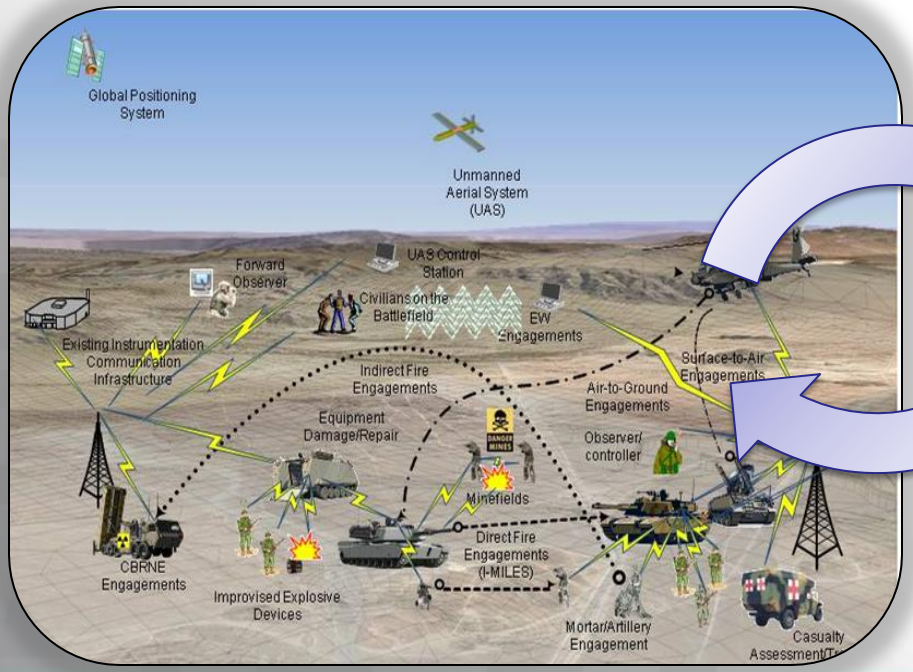
UAS, UGV, Air Defense, Collateral Effects, APS, Counter Sniper, IED, CBRNE, MLRS

Increment 3 — MS C — RDT&E — OPA — OMA 15 year Life Cycle

Counter Battery, Precision/Laser Guided Munitions, Artillery CM, OFOR AT Vismods, Improved Audio/Visual

Increment 4 — MS C — RDT&E — OPA — OMA 15 year Life Cycle

Non Lethal Weapon Systems, Mine/CM, Directed Energy Weapons, Naval Gunfire/Close Air Support



- ✓ Increment priority requirements based on availability of funds and TRL.
- ✓ Architecture Driven.
- ✓ Standards based.
- ✓ Aligns with Training-Instrumentation System (T-IS).

Challenges

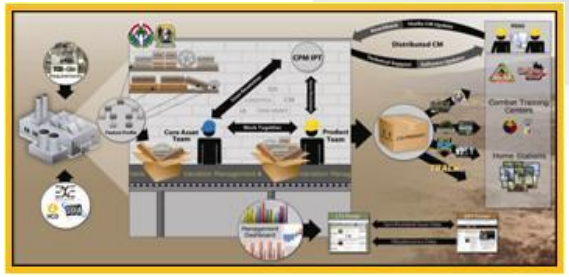
- 6 DOF, Precision Weapon Orientation.
  - ≤ ±3 angular Mils (appx. 3 mil-rad).
  - > 60 deg/sec slew rate.
- Burst on Target (BoT) Visual Effects.
  - ✓ MK-19.
  - ✓ M203/M320.
  - ✓ XM-25.
- Operationally Effective, Forward Observer Visual Cueing.
- Ultra-low latency Shooter-Target Communication.
  - ✓ XM-25 @ 50m.
  - ✓ Total system latency (trigger pull to BDA Visual/Audio Cue) = ~0.25 sec.
- Supportable mechanism for TESS software updating
  - ✓ LT2 PAN Update.
  - ✓ IS/TESS ICD Update.
  - ✓ Other Mechanisms.
- Laser Obscuration.

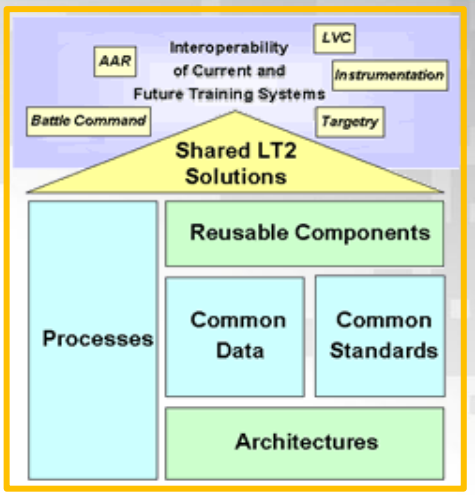
Supporting Initiatives

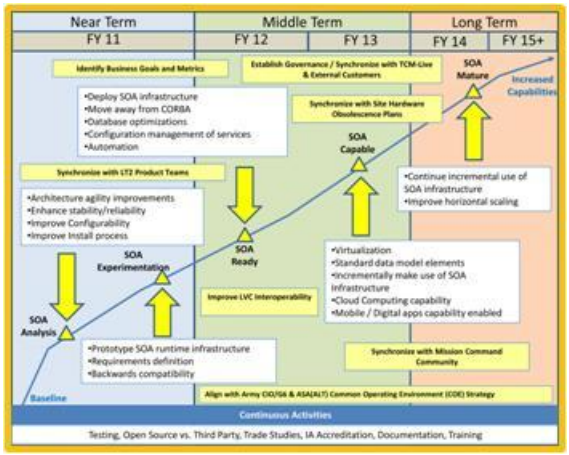
Architecturally driven, operationally proven.

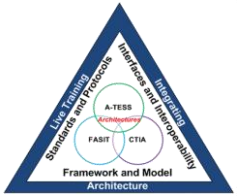
Consolidated Product Line Management (CPM)

- CPM IDIQ.
- Software Factory.
- 2nd Generation Product Line. Management (2GPLM).
- Consolidated CM.
- Integration & Development Environment (IDE).
- Core Asset Evolution.
- CTIA 4.0, Architectural Framework & Standards.
- System of Systems.
- LT2 Portal.

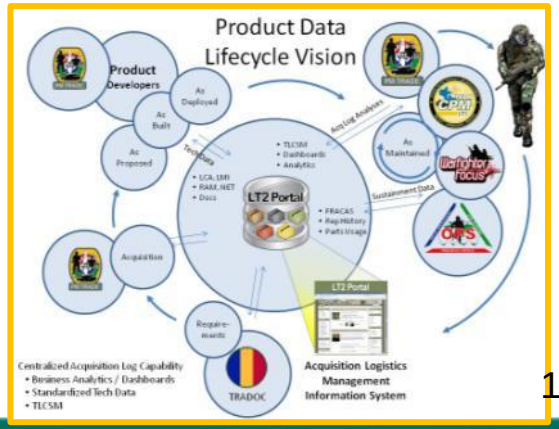








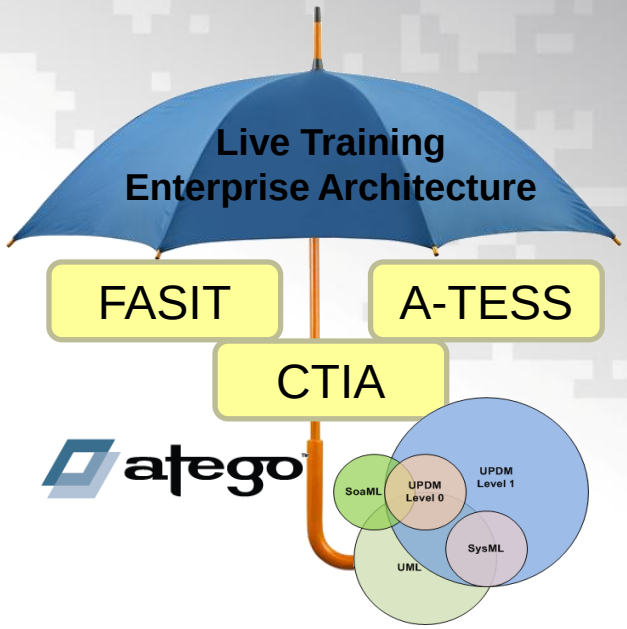
CTIA/SOA
A-TESS
LTEC
PAN



Architecture

Current Efforts

- Completed Tasks.
  - ✓ Completed a data driven market research to solidify an architectural tool to help manage our system-of-systems challenges.
  - ✓ Decomposed the NTC, JRTC and a Homestation product baseline into the tool.
  - ✓ Generation of a Live Training Enterprise Architecture.
  - ✓ Evolvement of CTIA, A-TESS and FASIT Reference Architectures.
- On Going.
  - ✓ Joint Government / Industry evolvement of reference architectures.
  - ✓ System of Systems Governance schema.
    - ✓ How to keep model up to date.
    - ✓ Impact Analysis.



Effective collaboration between Government and industry is key to evolving the LT2 product line.

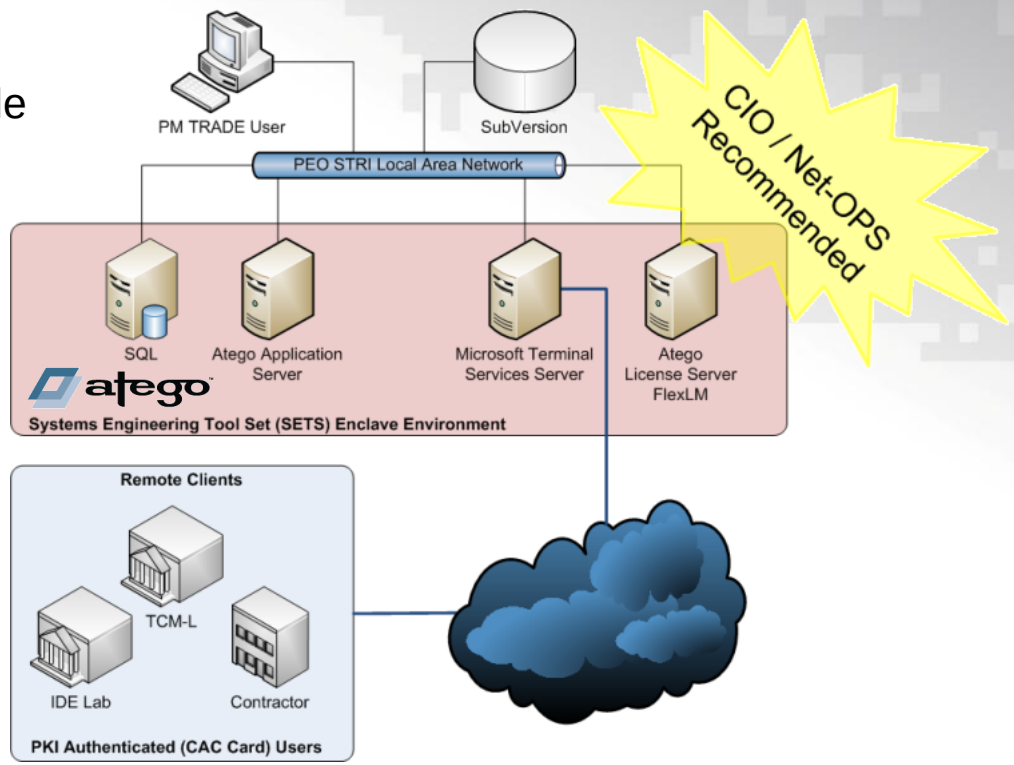
Architecture

Decision Analysis Report / Tool Evaluation

Why should you care?

- Remote access planned to be made available with use of a CAC.
- Growth potential for remote model development possible.
- PM TRADE is working to develop SOW and CDRL language to allow for UPDM/SysML deliveries on acquisition programs.
  - ✓ Needed to prevent stale data.
- Draft governance methodology is being developed.

Industry suggestions on Governance, contract verbiage and architectural content is critically needed.



Live access to the model can be found at www.lt2portal.org

Live Training Engagement Composition (LTEC)

Software Product Line Vision

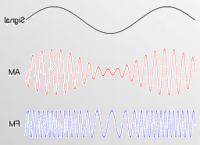
PM TRADE


Sensors

ISR

Data


MFVP



Player Input

Control

INPUTS

Portable Training Applications

Live Training Engagement Composition (LTEC) Services

Live Training Engagement Composition (LTEC) Services

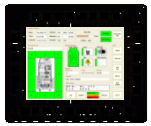
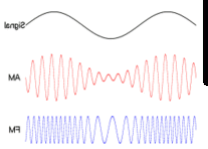
LTEC Core

Operating System Abstraction Layer (OSAL)

OUTPUTS

Emitters

Player Feedback

Status

Platform Independent

Appended







Embedded

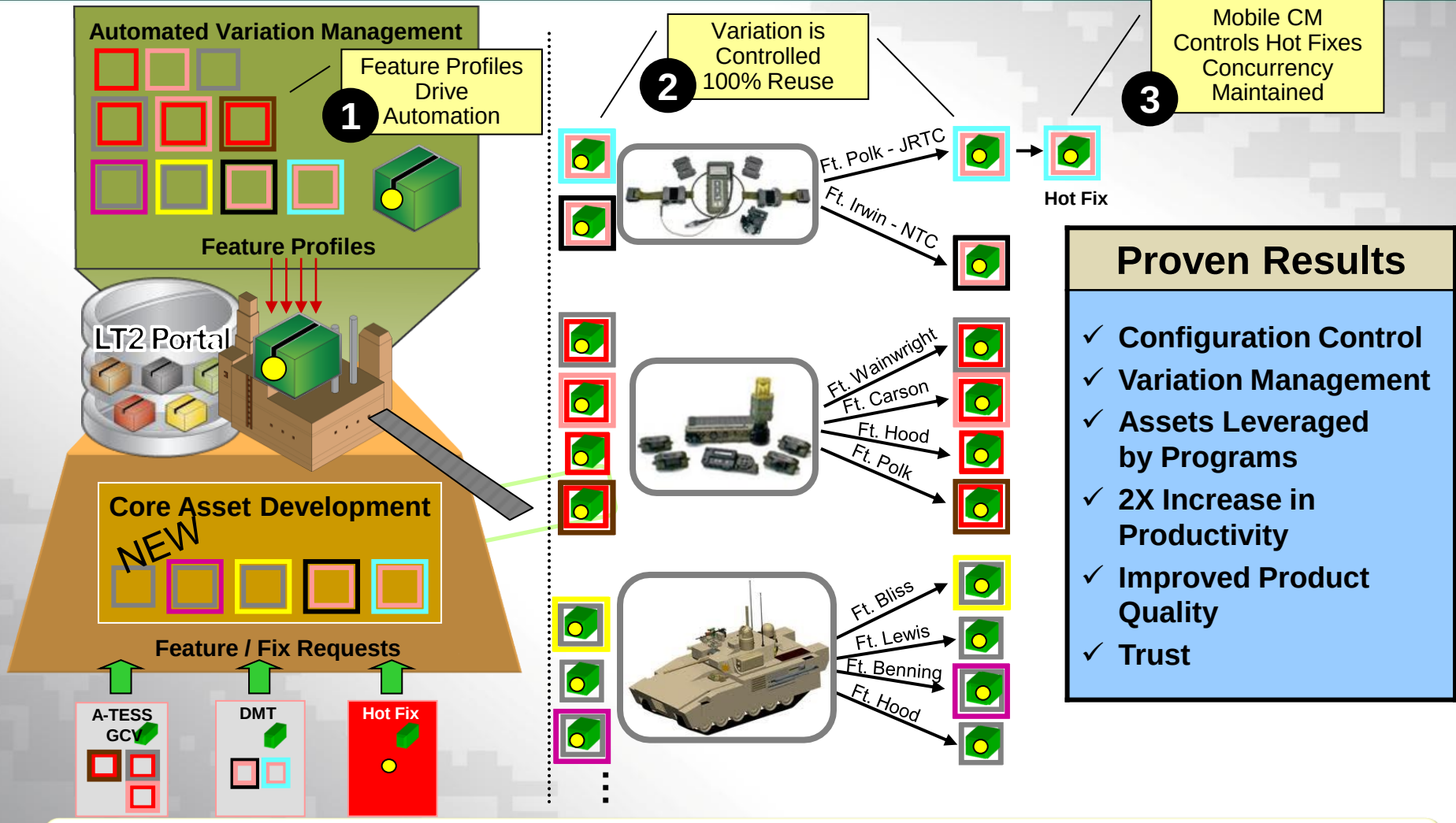
Live Training Engagement Composition (LTEC)

Example Compositions

	Appended Dismount	Appended Platform	Appended/ Embedded Hybrid	Embedded Platform
				
LTEC Services	MILES Sensor PAN I/F GPS Indoor Tracking	MILES Sensor MGT GPS 1553 Bus	MILES Sensor MGT GPS Platform Bus	Dual Use Laser ABCS I/F VKI Victory Bus
LTEC Core	LTEC Core	LTEC Core	LTEC Core	LTEC Core
Operating System	OSAL-Lite	Linux	Windows	VxWorks
Hardware Platform	IWS HCU	TVS VKC	VDET	Vehicle

Live Training Engagement Composition (LTEC)

"CTIA for TESS"



Proven Results

- ✓ **Configuration Control**
- ✓ **Variation Management**
- ✓ **Assets Leveraged by Programs**
- ✓ **2X Increase in Productivity**
- ✓ **Improved Product Quality**
- ✓ **Trust**

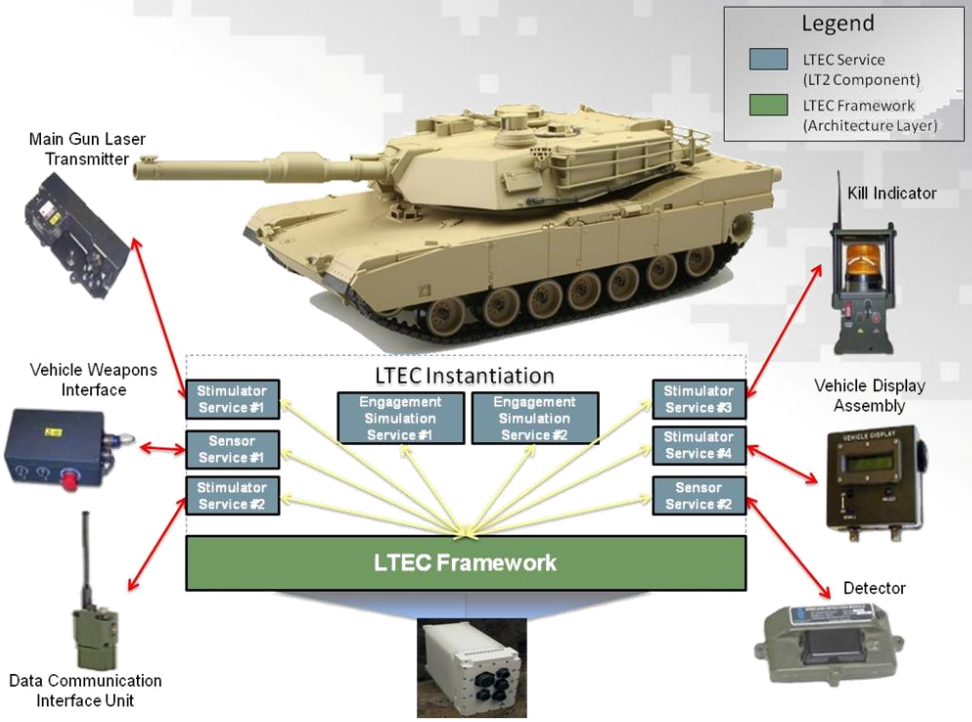
Leveraging software factory practices:

- ✓*Increased reliability.*
- ✓*Decreased testing.*
- ✓*Decreased risk.*
- ✓*Decreased Lifecycle cost.*
- ✓*Decreased time to field.*
- ✓*Maximum flexibility.*

Live Training Engagement Composition (LTEC)

"CTIA" for TESS / Features

- Service Oriented Architecture (SOA) approach to designing and managing TESS software.
- Government-owned software resides on LT2 Portal and available to industry.
- LTEC Developer's Guide documents LTEC Framework APIs.
- Common representation of the battle space entity supports L/V/C interoperability and reuse.
- Hardware platform and operating system agnostic.

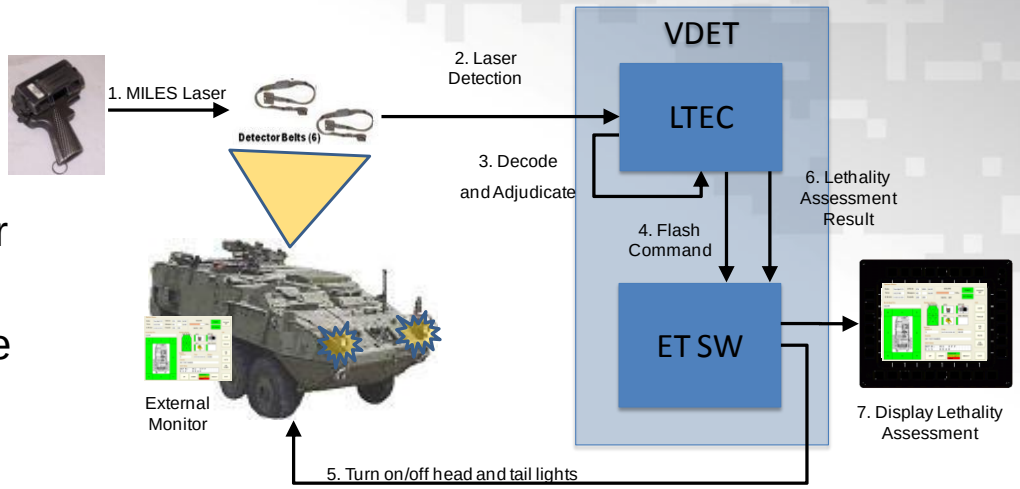


Scalable, sustainable and reusable approach to designing and deploying software.

Live Training Engagement Composition (LTEC)

"CTIA" for TESS / Benefits

- Platform/OS independence allows deployment on multiple hardware platforms.
- "Service Contracts & Agreements" insure interoperability between independently developed TESS components.
- Same software can be used for appended or embedded TESS.
- Composable services allow capabilities to be added, extended over time.
- Separation of business logic from device interfaces allows reuse across multiple products and use cases (including L/V/C).

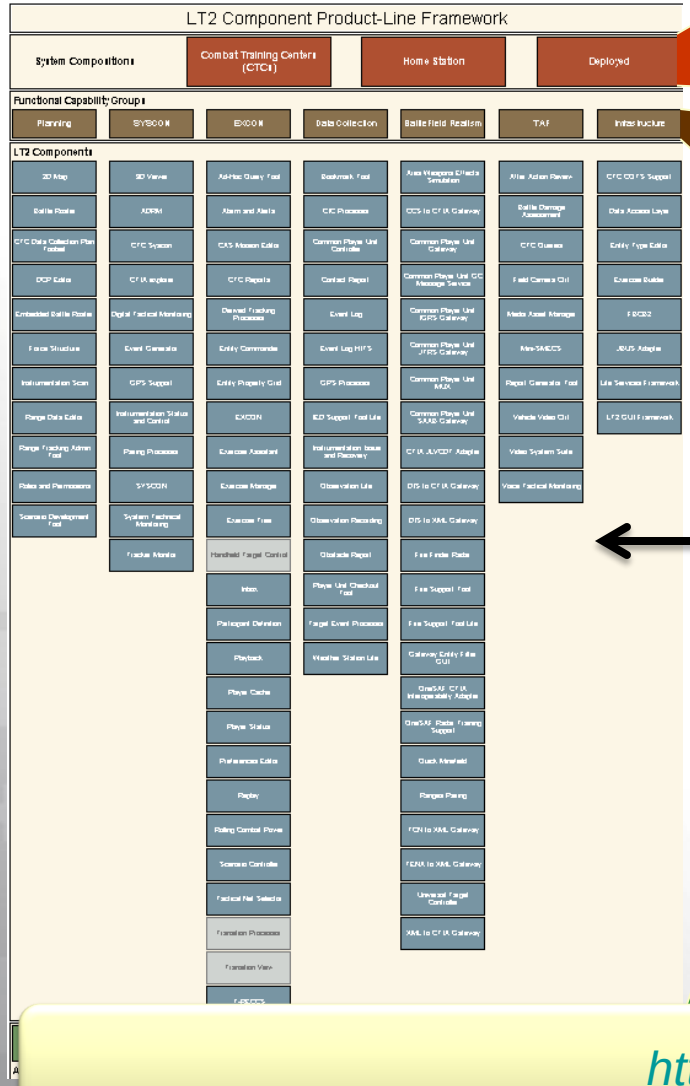


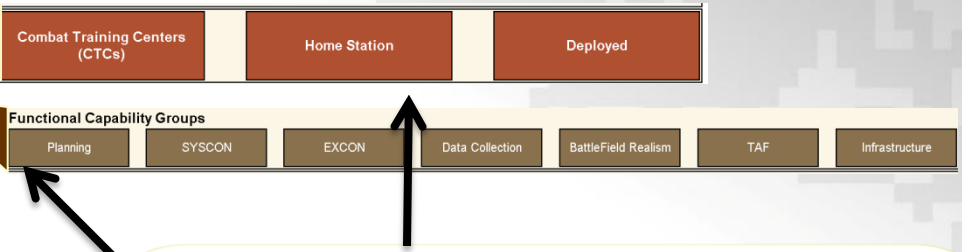
Initial capability demonstration:

- ✓ *Embedding MILES XXI-like capability on a Stryker.*
- ✓ *<u>Only</u> hardware used were MILES XXI Belts.*
- ✓ *LTEC running on Tactical Stryker VDET.*

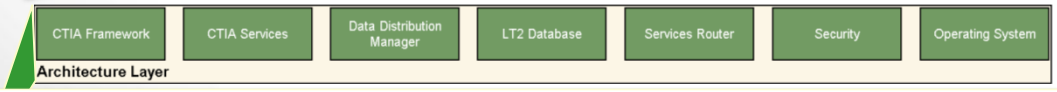
Live Training Engagement Composition (LTEC)

Current Product Line Architecture Framework





- LT2 PLAF defines the Product Line Architecture.
  - ✓ System Compositions.
  - ✓ Functional Capability Groups (FCGs).
  - ✓ LT2 Components.
  - ✓ Architecture Components.
- Current PLAF is CTIA-centric
  - ✓ Focused primarily on LT2 Components that are CTIA based.
  - ✓ System Components are essentially LT2 Products (systems that are CTIA based).
- For A-TESS and LTEC, we need to add some additional concepts to the LT2 PLAF to accommodate TESS.



http://www.lt2portal.org

Governance

CORE ASSET CHANGE PROPOSAL (CACP)

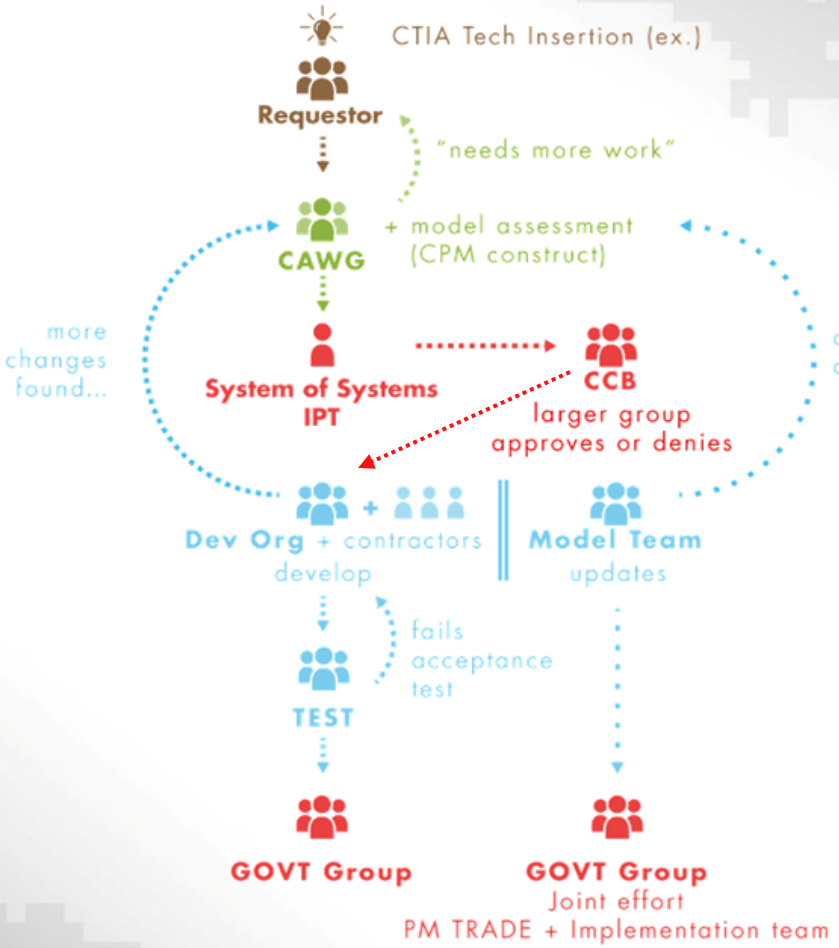
ASSESSMENT

APPROVAL

DEVELOPMENT / MODEL UPDATE

VALIDATION

DEPLOYMENT



Any member of the LT2 Product Line can submit a CACP

The CAWG consists of industry and government representatives that review the CACP and conducts impact assessments.

Model Team and Development Team collaborate to make sure model changes match implementation

Government teams for developer and model sustainer collaborate during validation, to ensure model matches implementation

<u>Draft</u> Governance document is available on the LT2 Portal.

Test & Training Initiatives

Growing the LTEC Product Line

- Automated Casualty Assessment (ACA).
  - ✓ Elimination of “MILES Casualty Cards”
  - ✓ Leverage existing OneTESS Engagement Methodology.
  - ✓ Focus on providing an **initial and usable** set of software.
  - ✓ Medic/Buddy/Self Aid growth area.
- Dismount
  - ✓ Design to work with a wide range of processing environments.
    - ➢ Current IWS HCU – Smart Phone
- Ground Combat Vehicle.
  - ✓ Embedded TESS.
- Physics Based Engagements.
  - ✓ Integrate RPEL into the LTEC Product Line.
  - ✓ JFCOM / Northrop Grumman Physics Based Model Alignment.
- Laser Test Range.
  - ✓ Support Test & Evaluation of emerging I-MILES/A-TESS acquisitions.
  - ✓ Evaluation of alternative laser technologies.
  - ✓ Augment MILES / TESS laboratory.

MILES/TESS Test Bed

Purpose

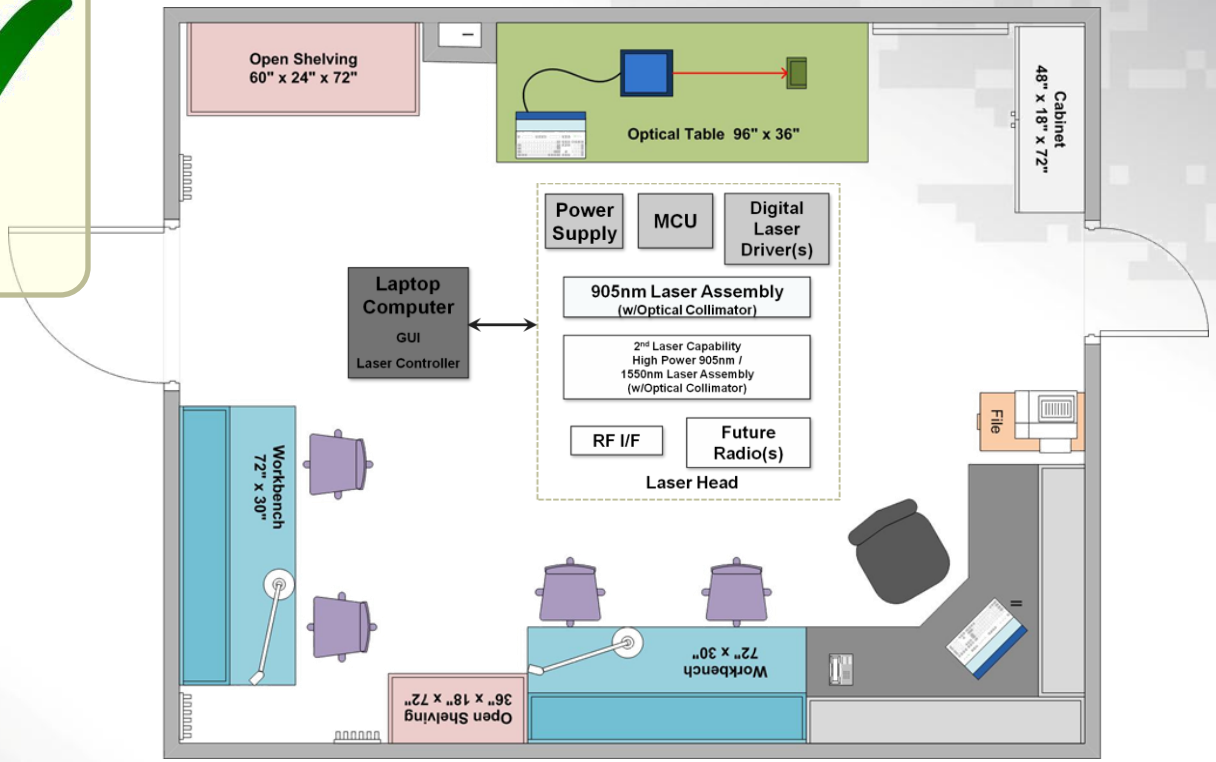
- **Purpose / Plan.**
  - ✓ Provide the capability to analyze, test and evaluate MILES laser equipment in a "standard" environment.
  - ✓ Begin with stand alone lab.
  - ✓ Evolve to an end-end TESS Test & Evaluation laboratory with a LT2 Core IS.
- **Possibilities & Planned Uses.**
  - ✓ Analysis of system functionality and new technologies.
  - ✓ Trade studies and Technology Readiness Evaluations (TREs).
  - ✓ Acceptance testing.
  - ✓ Trouble shoot issues identified in the field.
  - ✓ Independent, contractor integration and test.

Located in the heart of Research Parkway, RDECOM-STTC.

MILES/TESS Test Bed

Evolutionary Growth

- **Phase I, Completed Q2FY13.**
  - ✓ Lab Facility
  - ✓ MILES Laser Test Set
- **Phase II, Completed Q2FY13.**
  - ✓ Laser Characterization.
  - ✓ Laser Detector Test Set.
- **Phase III, ETC Q4FY13.**
  - ✓ Detector Sensitivity Test Set.
- **Phase IV, ETC Q2FY14.**
  - ✓ Lab Expansion – RF Lab.
  - ✓ RF Communications Test Sets.
- **Phase V, ETC Q4FY14.**
  - ✓ Geo-Paring Test Set.
- **Phase VI, ETC Q2FY15.**
  - ✓ R&D, 7m RF Anechoic and Shield Room.



The "Gold Standard" for TESS Test & Evaluation.

Way Ahead

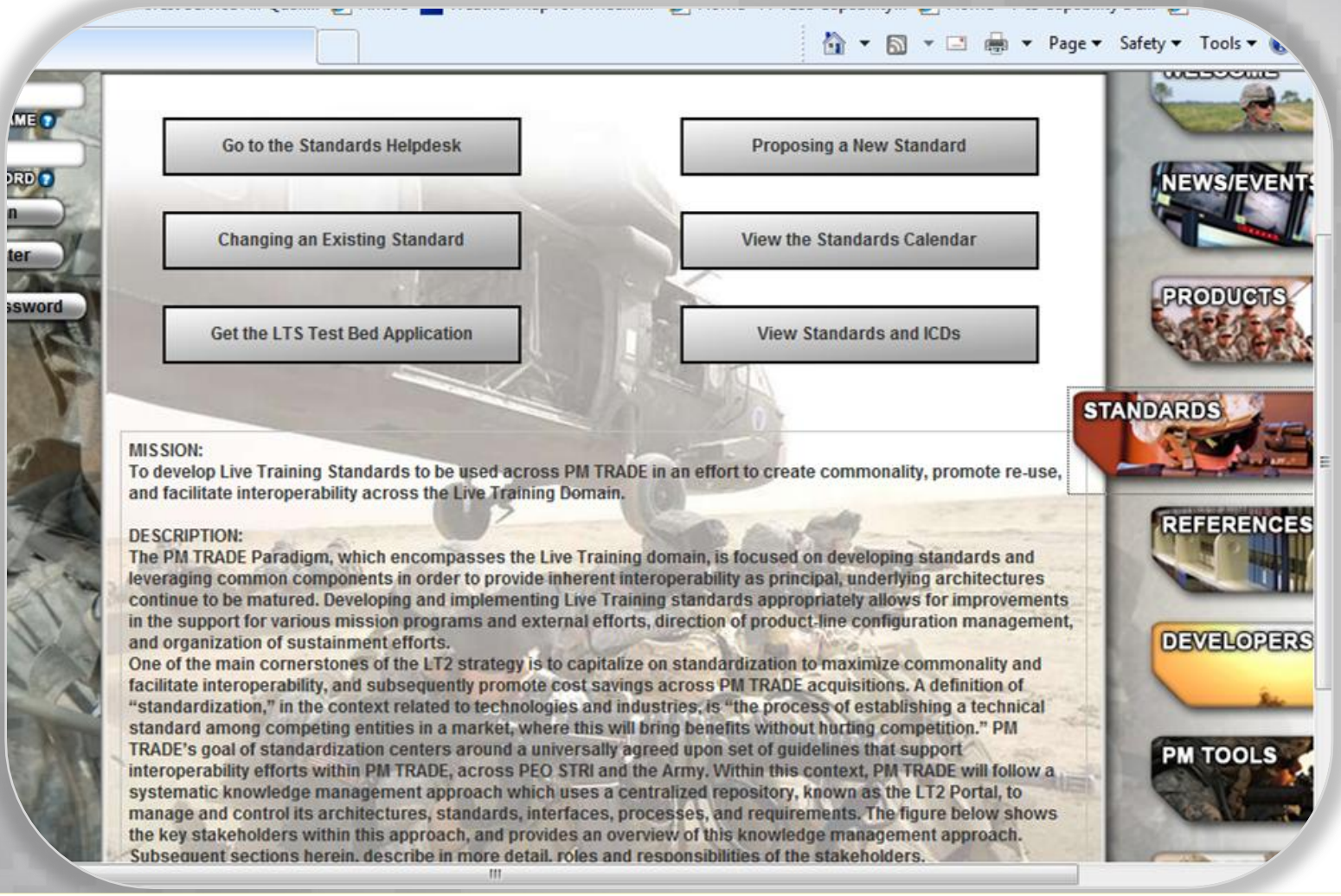
- Collaborate & Design.
  - ✓ Nothing is off the table.
  - ✓ Start from the notion of what TESS would look like if we started today.
  - ✓ Architecturally aligned.
  - ✓ Standards based.
  - ✓ Grow the LTEC Software Product Line.
  - ✓ LT2 Governance.
  - ✓ Leverage UCATT efforts.
- Test & Experiment.
  - ✓ TESS Lab.
  - ✓ Standard compliance.
  - ✓ Demonstrate new technology.
- ✓ Retire & Refresh.
  - ✓ Retire legacy MILES.
  - ✓ M2K obsolescence by 2018.

A-TESS: Operationally Effective and Suitable; Fiscally Responsible.

LT2 Standards Body

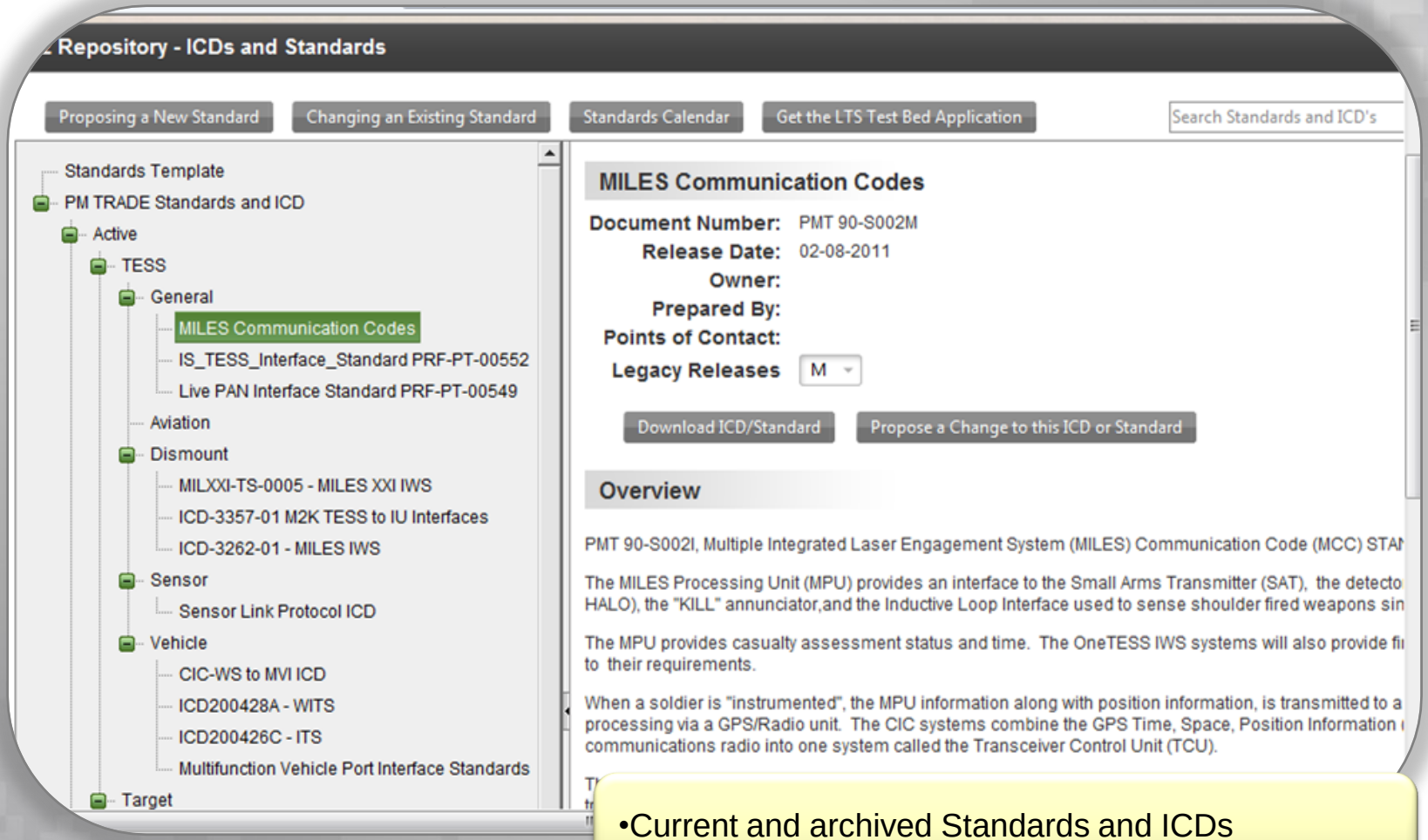
Architecturally driven, operationally proven.

LT2 Standards Portal Update



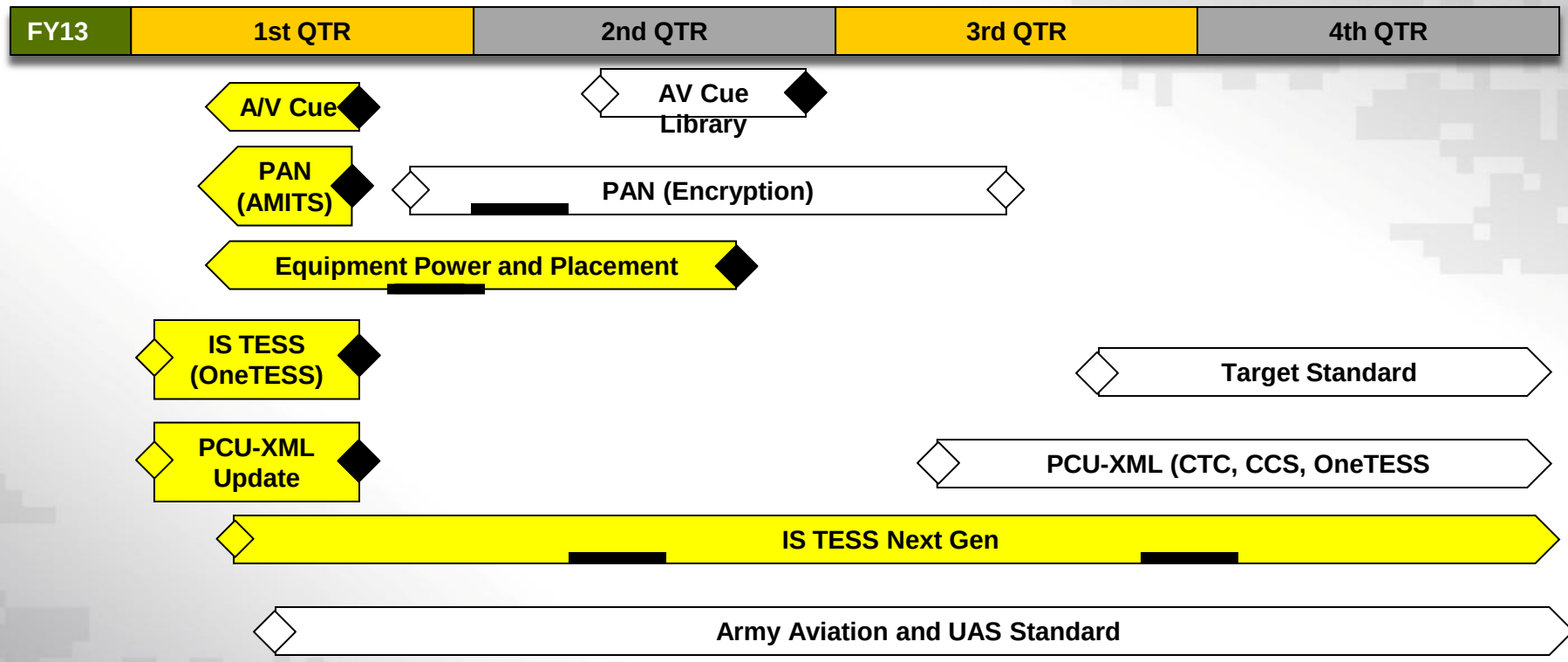
LT2 Community has released a new standards page!
https://www.lt2portal.org/

LT2 ICD Portal Update



- Current and archived Standards and ICDs
- Limited distribution documents require Portal login

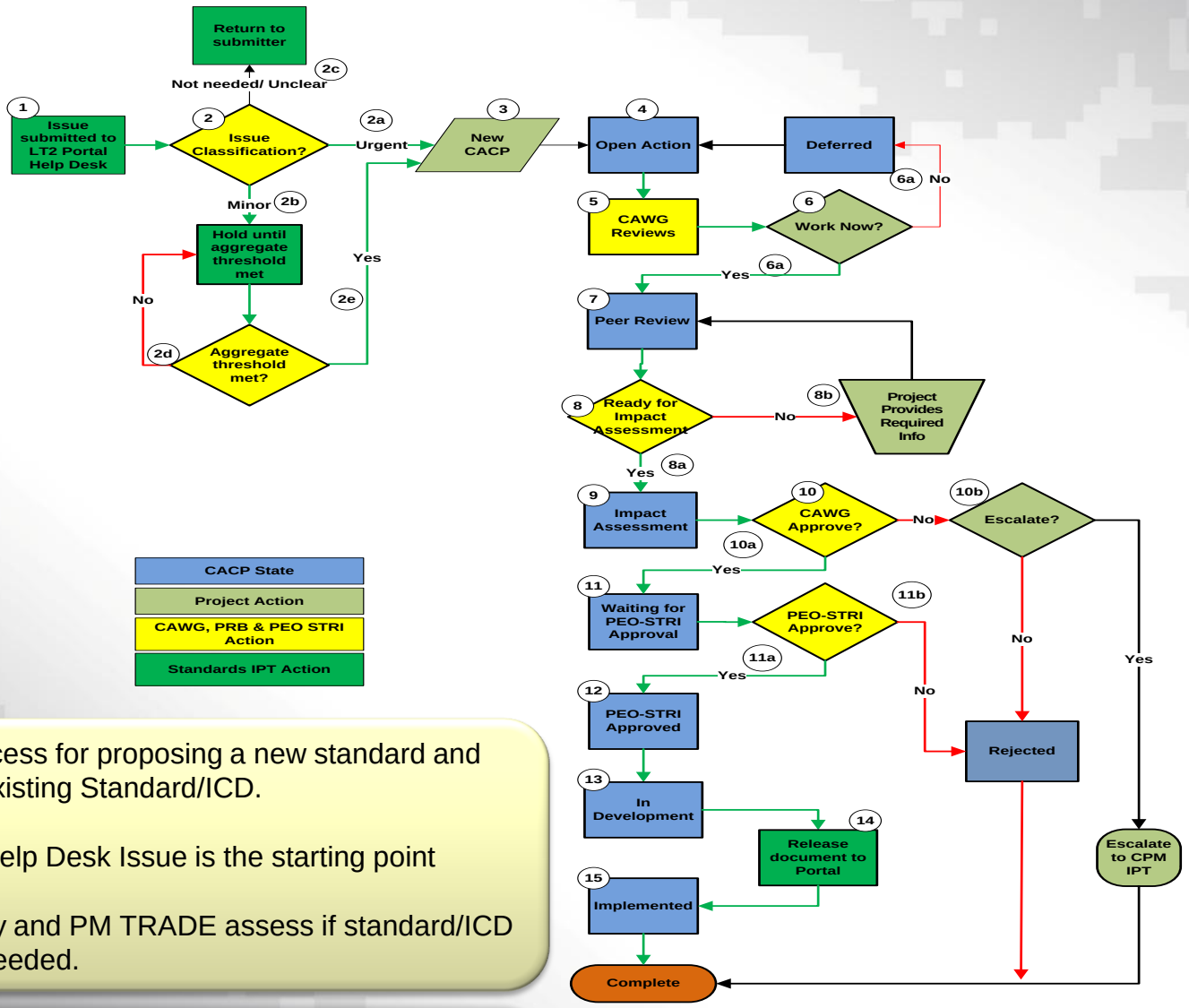
PM TRADE Standards Calendar FY13



- FY 12 – FY 14 Planning Calendar
- Subject to change due to funding

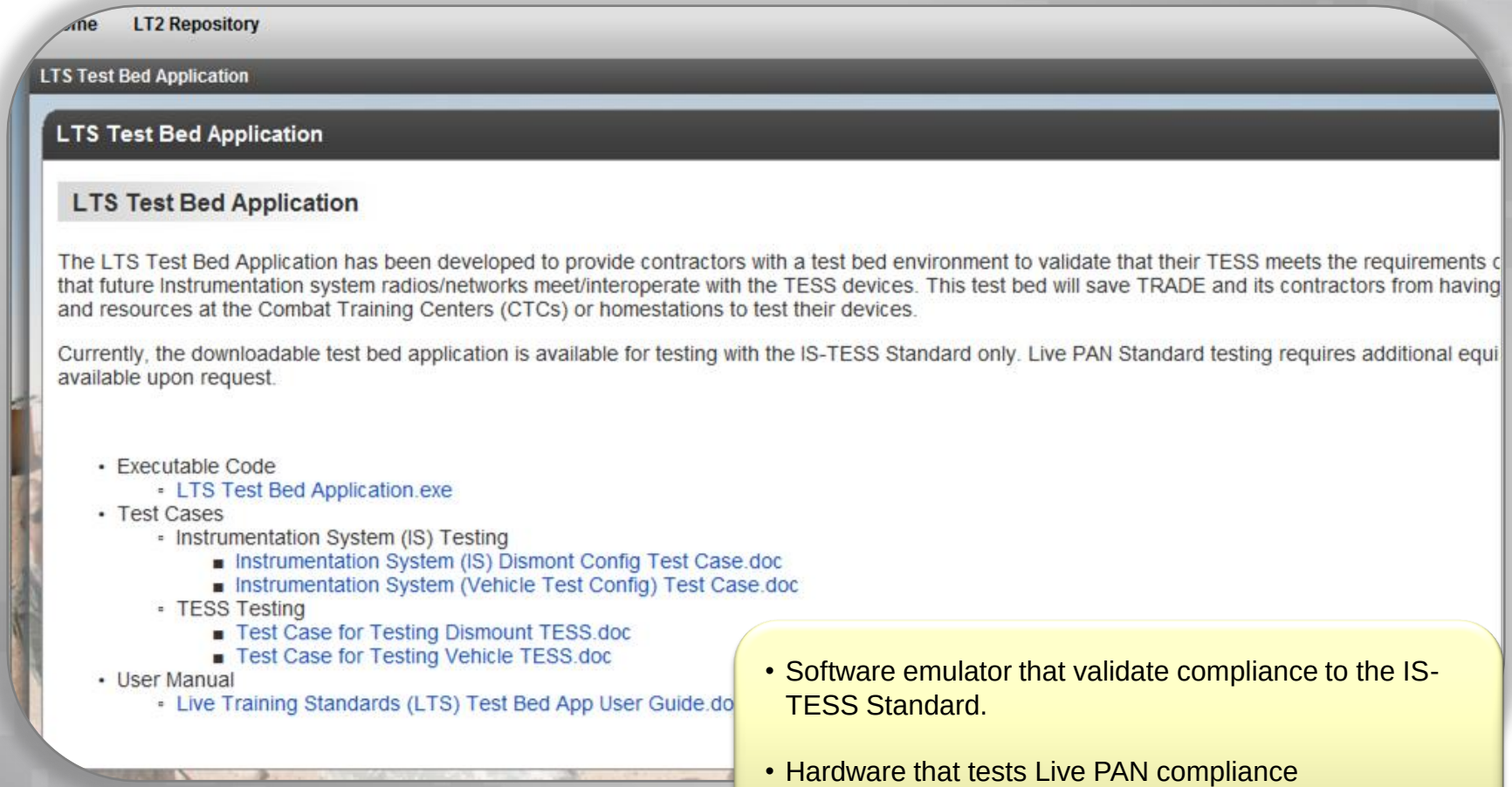
Start of Effort | Published | Industry Feedback | Completed | Active

PM TRADE Standards Change Process



- Describes process for proposing a new standard and changing an existing Standard/ICD.
- Submitting a Help Desk Issue is the starting point
- LT2 community and PM TRADE assess if standard/ICD or change is needed.

IS/TESS Test Bed

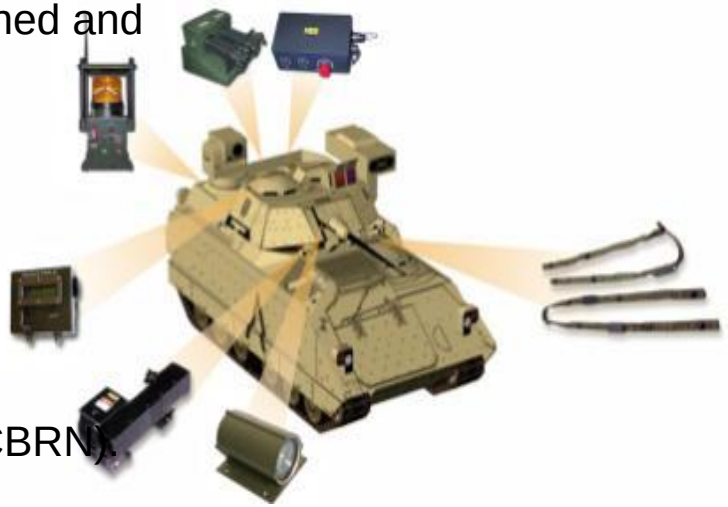


- Software emulator that validate compliance to the IS-TESS Standard.
- Hardware that tests Live PAN compliance
- Future integration with the TESS test bed.

LT2 Standards

Audio / Visual Cueing

- **Purpose**: Define the Audio/Visual cues that training devices provide to Live Participants (BlueFor, OPFOR, Role-player, Combat/Trainers).
- **Scope:**
  - ✓ Short Term (version 1.0 of the standard).
    - ➢ TESS (Status Indicator, Weapon Signature, User Interface).
    - ➢ Individual, Manned and Unmanned Ground, Manned and Unmanned Aerial Vehicles.
    - ➢ Initial Indirect Fire Chain.
    - ➢ IEDs.
  - Long Term (FY 13+).
    - ➢ Medical.
    - ➢ Complete Indirect Fire Chain.
    - ➢ Chemical Biological, Radiological and Nuclear (CBRN).
    - ➢ Linkage into ATESS architecture.
    - ➢ Targets.
- **Schedule**: Second release of draft to industry in Dec 2012



LT2 Standards

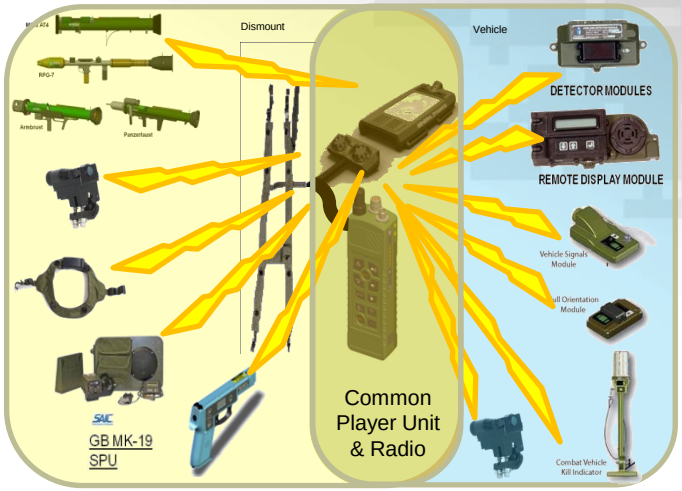
Power Standard

- **Purpose**: Define specifications for the sources, interfaces and distribution for battery, vehicle, shore, and portable power.
- **Scope:** Cover all types of power.
  - ✓ Short Term (version 1.0 of the standard).
    - ➢ Standards committee is currently determining initial scope.
    - ➢ Potentially include batteries.
    - ➢ Distribution and sharing power between different Programs of Record's equipment (TESS and Radio).
  - ✓ Long Term Vision.
    - ➢ Work with TCM Soldier to standardized small unit battery usage.
    - ➢ Work with the vehicle PMs to understand the power provided by the multifunction vehicle port.
- **Schedule**
  - ✓ Draft for industry comments (focused on high capacity batteries) by 31 Dec 2012

LT2 Standards

PAN Standard

- **Status**: Version 1 Rev 1 Published on LT2 Portal. Vendors and PM LTS have requested modifications.
- **Scope**:
  - ✓ Removing 900MHz capability from Std.
    - ➢ Allow PM LTS to have common components across all programs and locations.
  - ✓ Adding other interfaces to the Std.
    - ➢ Current Std only includes wireless.
    - ➢ Adding wired interfaces to support LTEC.
    - ➢ Adding other functionality i.e. repeater.
- **Schedule**: Release of Rev C in December 2012.

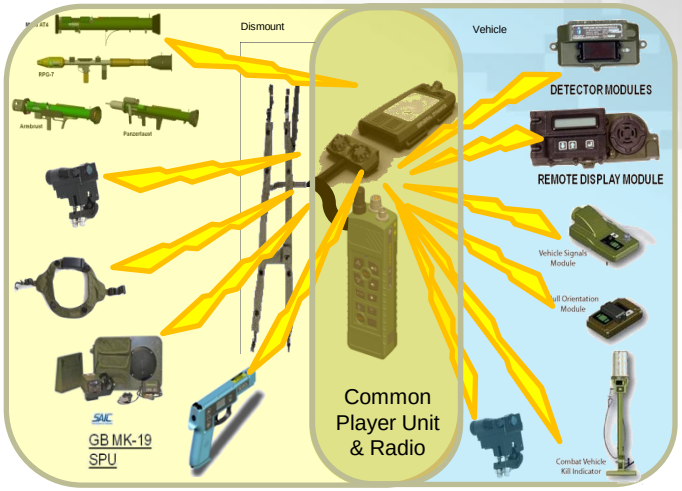


LT2 Standards

PAN Extension

- **Issue**:
  - ✓ COTS devices (e.g. tablets) does not typically include a LT2 PAN capability.
  - ✓ LT2 PAN has a low data rate.

- **Action**:
  - ✓ Study applicability of commercial standards to Live Training Use Cases
  - ✓ Use Cases include
    - ➢ Client – Server (ie TESS component)
    - ➢ Broadcast of events (ie IED detonation)
    - ➢ Exchange of data (ie Medical)
  - ✓ Standards include.
    - ➢ Bluetooth , Bluetooth Low Energy, NFC.

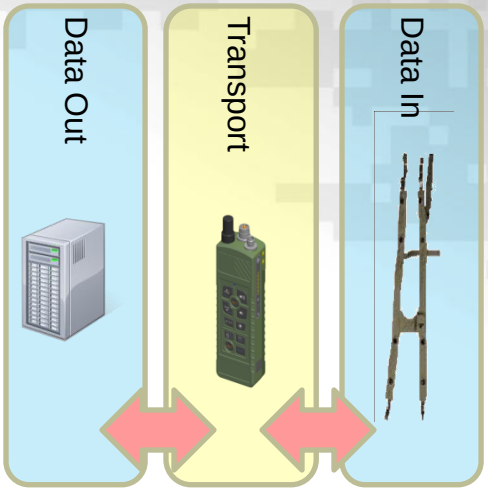


- **Schedule**: 2Q, FY 13 Industry Meeting.

LT2 Standards

IS/TESS ICD Redesign

- **Issue**:
  - ✓ Current IS TESS includes message format which
    - ➢ Forces customization of COTS
    - ➢ Requires modification to radios to change TESS messages
- **Action**:
  - ✓ Remove message format from IS TESS Std
  - ✓IS TESS defines connection between radio and device; inserted header information, etc
  - ✓Radios systems transport data as received
- **Schedule**: 2Q, FY 13 Industry Meeting.



Wrap-Up

Future Workshops

Proposed

- Training Effectiveness & Usage Tracking.
- Live Training Engagement Composition (LTEC).
  - ✓ Compose-ability.
  - ✓ Embedded Training.
- Laser Communications.
  - ✓ Q2FY13 SBIR.
  - ✓ UCATT.
  - ✓ Dual Protocol Laser Transmitters & Detectors.
- Redesign IS-TESS ICD.
  - ✓ Promote passing of software updates from IS to TESS.
  - ✓ Eliminate discrete message dependency at the IS radio.
- LT2 PAN Standard.
  - ✓ Promote passing of software update from IS to TESS.

How many, when and who will attend?

Communicating with Industry

- Communicating with you is important to us.
  - ✓ We intend to keep industry informed and involved.
  - ✓ Government wants feedback and participation.
- LT2 Portal Community Collaboration Area
  - ✓ From LT2 Portal (https://www.lt2portal.org/).
    - ➢ Select “Collaborate” (must register for an account, but no security clearance required).
- How to provide feedback.
  - ✓ Use Portal Collaboration Area.
  - ✓ Create Issues/Topics, Forum Posts, Email Community.

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Questions?

Visit the Live Training Community Portal at:
LT2Portal.org